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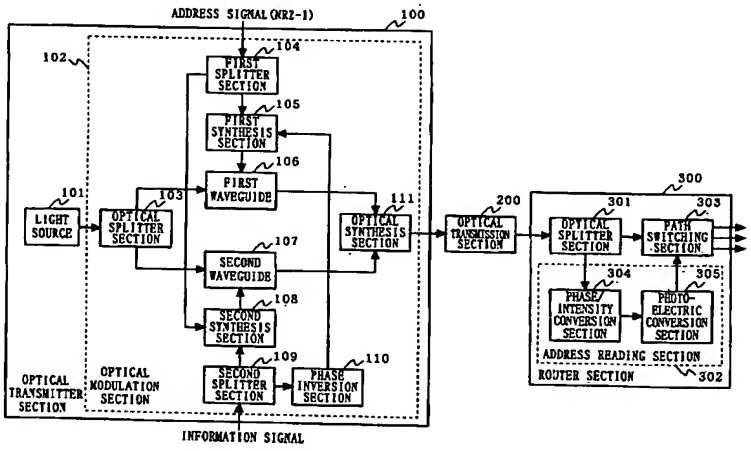
(54) Title: OPTICAL PACKET EXCHANGER




(57) Abstract: An optical packet exchanger is provided which, in a situation where a transmission path for an optical packet is to be switched by using an address signal, prevents the transmittable capacity for the information signal from being decreased, and which facilitates the extraction of the address signal even if the modulation speed for the information signal becomes high. An optical modulation section 102 outputs an optical packet obtained by subjecting output light from a light source 101 to an intensity modulation using an information signal and a phase modulation using an address signal corresponding to a transmission destination for the information, signal. An optical splitter section 301 splits the optical packet received via the optical transmission section 200 into two optical packets. An address reading section 302 reads the address signal from the phase of one of the optical packets output from the optical splitter section 301. Based on the address signal output from the address reading section 302, a path switching section 303 determines an output port for the other optical packet

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

[２００５年２月１８日（１８．０２．０５）国際事務局受理：出願当初の請求の範囲４，６，７，９，１２，１３，１５－１９，２１，２２，２４－２８，３０，３７，３９，４０，４２－４６及び４８は取り下げられた；他の請求の範囲は変更なし。]

optical packets;

an address reading section for reading the address signal based on phase information of one of the optical packets output from the optical splitter section; and

a path switching section having a plurality of output ports and selecting, based on the address signal read by the address reading section, one of the plurality of output ports from which to output the other optical packet output from the optical splitter section.

4. (CANCEL)

5. The optical packet exchanger according to claim 1, wherein,

the optical transmitter section includes:

a light source for outputting continuous light; and

an optical modulation section for outputting an optical packet which is obtained by subjecting the output light from the light source to an intensity modulation using the information signal and a phase modulation using the address signal, and

the router section includes:

an optical splitter section for splitting the optical packet received via the optical transmission section into two optical packets;

an address reading section for reading the address signal based on phase information of one of the optical packets output from the optical splitter section;

an optical phase adjustment section for adjusting a phase of the other optical packet output from the optical splitter section to a constant phase value, based on the address signal read by the address reading section; and

a path switching section having a plurality of output ports and selecting, based on the address signal read by the address reading section, one of the plurality of output ports from which to output the other optical packet whose phase has been adjusted to the constant phase value by the optical phase adjustment section.

6. (CANCEL)

7. (CANCEL)

8. The optical packet exchanger according to claim 2, wherein,

the optical modulation section comprises:

an optical splitter section for splitting the output light from the light source into two light portions;

a first splitter section for splitting the address signal into two address signals;

a second splitter section for splitting the information

signal into two information signals;

a phase inversion section for inverting a phase of one of the information signals output from the second splitter section;

a first synthesis section for combining one of the address signals output from the first splitter section with the information signal whose phase has been inverted by the phase inversion section, to output a first synthesized signal;

a second synthesis section for combining the other address signal output from the first splitter section with the other information signal output from the second splitter section, to output a second synthesized signal;

a first waveguide for subjecting one of the light portions output from the optical splitter section to a phase modulation using the first synthesized signal;

a second waveguide for subjecting the other light portion output from the optical splitter section to a phase modulation using the second synthesized signal; and

an optical synthesis section for permitting optical synthesis and interference between the optical phase modulated signal output from the first waveguide and the optical phase modulated signal output from the second waveguide to generate the optical packet.

9. (CANCEL)

10. The optical packet exchanger according to claim 1, wherein,

a modulation speed for the address signal and a modulation speed for the information signal are different.

11. The optical packet exchanger according to claim 2, wherein,

the address reading section includes:

a phase/intensity conversion section for outputting an optical signal which is obtained by converting optical phase variation in one of the optical packets output from the optical splitter section into optical intensity variation; and

a photoelectric conversion section for converting the optical signal output from the phase/intensity conversion section into an address signal.

12. (CANCEL)

13. (CANCEL)

14. The optical packet exchanger according to claim 5, wherein,

the address reading section includes:

a phase/intensity conversion section for outputting an optical signal which is obtained by converting optical phase

variation in one of the optical packets output from the optical splitter section into optical intensity variation; and

a photoelectric conversion section for converting the optical signal output from the phase/intensity conversion section into positive and negative address signals, the negative address signal being obtained by inverting the polarity of the positive address signal, and outputting the positive address signal to the path switching section and the negative address signal to the optical phase adjustment section.

15. (CANCEL)

16. (CANCEL)

17. (CANCEL)

18. (CANCEL)

19. (CANCEL)

20. The optical packet exchanger according to claim 11, wherein,

the photoelectric conversion section converts an intensity of the optical signal output from the phase/intensity conversion section to logic value 1 if the intensity is equal to or less than

a predetermined threshold value and to logic value 0 if the intensity is greater than the predetermined threshold value, thereby extracting the address signal.

21. (CANCEL)

22. (CANCEL)

23. The optical packet exchanger according to claim 20, wherein,

the threshold value is equal to or greater than a value which is 1/4 as large as a difference between an optical intensity of the optical packet input to the optical splitter section at logic value 1 and an optical intensity of the optical packet at logic value 0, and is equal to or less than a value which is 1/2 as large as the optical intensity of the optical packet at logic value 0.

24. (CANCEL)

25. (CANCEL)

26. (CANCEL)

27. (CANCEL)

28. (CANCEL)

29. The optical packet exchanger according to claim 11, wherein,

the phase/intensity conversion section outputs two optical signals whose modulated components are out of phase.

30. (CANCEL)

31. The optical packet exchanger according to claim 1, wherein,

the optical transmitter section includes:

a light source for outputting continuous light; and

an optical modulation section for outputting an optical packet which is obtained by subjecting the output light from the light source to a phase modulation using the information signal and an intensity modulation using the address signal, and

the router section includes:

an optical splitter section for splitting the optical packet received via the optical transmission section into two optical packets;

an address reading section for reading the address signal from intensity information of one of the optical packets output from the optical splitter section; and

a path switching section having a plurality of output

ports and selecting, based on the address signal read by the address reading section, one of the plurality of output ports from which to output the other optical packet output from the optical splitter section.

32. The optical packet exchanger according to claim 1, wherein,

the optical transmitter section includes:

a light source for outputting continuous light; and

an optical modulation section for outputting an optical packet which is obtained by subjecting the output light from the light source to a phase modulation using the information signal and an intensity modulation using the address signal, and

the router section includes:

an optical splitter section for splitting the optical packet received via the optical transmission section into two optical packets;

an address reading section for reading the address signal from intensity information of one of the optical packets output from the optical splitter section;

an optical intensity adjustment section for adjusting an intensity of the other optical packet output from the optical splitter section to a constant intensity value, based on the address signal read by the address reading section; and

a path switching section having a plurality of output

ports and selecting, based on the address signal read by the address reading section, one of the plurality of output ports from which to output the other optical packet whose intensity has been adjusted to the constant intensity value by the optical intensity adjustment section.

33. A router for switching a transmission path for an optical packet which constitutes a burst-type optical signal and on which an information signal and an address signal corresponding to a transmission destination for the information signal are superposed by different modulation methods, the router comprising:

an optical splitter section for splitting the optical packet into two optical packets;

an address reading section for reading the address signal based on phase information of one of the optical packets output from the optical splitter section; and

a path switching section having a plurality of output ports and selecting, based on the address signal read by the address reading section, one of the plurality of output ports from which to output the other optical packet output from the optical splitter section.

34. The router according to claim 33, further comprising an optical phase adjustment section for adjusting a phase of the other optical packet output from the optical splitter section to

a constant phase value based on the address signal read by the address reading section, and thereafter outputting the other optical packet to the path switching section.

35. The router according to claim 33, wherein,

the address reading section includes:

a phase/intensity conversion section for outputting an optical signal which is obtained by converting optical phase variation in one of the optical packets output from the optical splitter section into optical intensity variation; and

a photoelectric conversion section for converting the optical signal output from the phase/intensity conversion section into an address signal.

36. The router according to claim 34, wherein,

the address reading section includes:

a phase/intensity conversion section for outputting an optical signal which is obtained by converting optical phase variation in one of the optical packets output from the optical splitter section into optical intensity variation; and

a photoelectric conversion section for converting the optical signal output from the phase/intensity conversion section into positive and negative address signals, the negative address signal being obtained by inverting the polarity of the positive address signal, and outputting the positive address signal to the

path switching section and the negative address signal to the optical phase adjustment section.

37. (CANCEL)

38. The router according to claim 35, wherein,

the photoelectric conversion section converts an intensity of the optical signal output from the phase/intensity conversion section to logic value 1 if the intensity is equal to or less than a predetermined threshold value and to logic value 0 if the intensity is greater than the predetermined threshold value, thereby extracting the address signal.

39. (CANCEL)

40. (CANCEL)

41. The router according to claim 38, wherein,

the threshold value is equal to or greater than a value which is 1/4 as large as a difference between an optical intensity of the optical packet input to the optical splitter section at logic value 1 and an optical intensity of the optical packet at logic value 0, and is equal to or less than a value which is 1/2 as large as the optical intensity of the optical packet at logic value 0.

42. (CANCEL)

43. (CANCEL)

44. (CANCEL)

45. (CANCEL)

46. (CANCEL)

47. The router according to claim 35, wherein,

the phase/intensity conversion section outputs two optical signals whose modulated components are out of phase.

48. (CANCEL)